LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -A

WATERBODY MANAGEMENT PLAN SERIES

HENDERSON LAKE

LAKE HISTORY & MANAGEMENT ISSUES

CHRONOLOGY

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LAKE HISTORY

GENERAL INFORMATION

Date formed
Henderson Lake is a man-made lake formed in the 1930's by the Atchafalaya Levee construction for flood control by the U.S. Army Corps of Engineers (USACE). The damming of Bayou Berard and other streams stopped the natural drainage of this area and caused flooding during normal low water stages. Most of the flooded areas were owned by St. Martin Land Company. In 1963 and 1964, earthen dams were constructed on the outlet channel. A permanent control structure was put in place in 1968 and set at an elevation of 7.5 MSL. Due to a written agreement with the St. Martin Land Company, in the 1970's the elevation of the lake was increased to 9.0 MSL but would never exceed this height. The structure remained operative but siltation issues made operation of the structure difficult. Improvements and repairs to the structure were conducted in 1985-1986 and 2006. Minor work on the control structure was done in July 2013 to address mechanical issues. The damaged chain-link fencing around the structure was replaced in July 2014 in order to keep trespassers out. Since 2003, over $500,000 has been spent by St. Martin Parish Government on repair costs for the structure. (Guy Cormier, personal comm.).

Impoundment (Backwater area)
Henderson Lake is a backwater swamp consisting mainly of cypress, willow, and cottonwood trees. Numerous trees, stumps, logs, and submerged vegetation make up the majority of the lake's habitat.

Owners – U.S. Army Corp of Engineers , St. Martin Land Co., State of Louisiana, and private land owners.

Purposes for creation – Recreational Activities and oil & gas exploration. In the document 'Atchafalaya Basin Floodway System Project, Louisiana, Master Plan Feasibility Study/Final Environmental Impact Statement' (USACE 1982), 13 water management units (WMUs) were considered in the Atchafalaya Basin Floodway System. The Henderson WMU was one of 5 recommended for initial construction. The 5 WMUs were selected for improved water quality, enhanced fish and wildlife, and controlled sediment flow (USACE 1982).

Size (Surface Acres)
5,000 surface acres at pool stage.

Watershed
170,000 acres.

Pool stage
9.0 ft. MSL at the Pelba @ I-10 gauge.
Link to gauge: http://waterdata.usgs.gov/usa/nwis/uv?site_no=302020091435700

Parish/s located
Located in St. Martin parish 20 miles east of Lafayette, Louisiana (Latitude – 30° 20' - Longitude – 91° 45')

Border waters
Courtableau Bayou on the north end and the Atchafalaya River on the south end.

Drawdown description
The southern control structure is located in St. Martin Parish, south of Henderson Lake in the borrow canal adjacent to the West Atchafalaya Basin Protection Levee (WABPL). The drawdown structure is a gated system that can be opened to allow ingress and egress of boat traffic and can be used to dewater the lake (See map of structure locations, Figure 1).

The drawdown capability of Henderson Lake is directly related to the Atchafalaya River stage. Once the river has dropped below 9 ft. MSL at the Butte La Rose gauge, the closed structure will keep Henderson Lake at 9.0 ft. If opened, the structure will allow the lake to be lowered as far down as the river level potentially drops. If the river stage exceeds 9.0 ft. MSL, the water will back flow over the control structure, raising the level of the lake.

It is recommended that the water level in Henderson Lake be lowered at a rate of no more than 2-4 inches/day. At this rate the lake would roughly be drawn down 2 feet in 14 days. It is also recommended that during a drawdown, the structure only be partially opened, to slow drainage. If the gate were fully opened, the increase in current would result in the disturbance of decaying organic material within the lake as it flows towards the structure. This suspended material will reduce the dissolved oxygen content in the water which stresses fish and other aquatic life, potentially resulting in a fish kill.

The desired water level during a drawdown is 6.0 ft. MSL. At this stage, the flats directly north and south of the I-10 Bridge are exposed to air and sunlight. This area is one of the most problematic areas with invasive aquatic vegetation issues. This level also exposes most shallow areas in the northern half of the lake, stranding invasive vegetation that accumulates in that area during the summer months. The further lowering of the water level beyond 6.0 ft. MSL is not recommended due to the minimal benefits received versus the potential additional stress put on fish populations by continuing to reduce available habitat. Perhaps just as important as the biological rationale though, reducing the water level below 6.0 ft. MSL also further risks the exposure of a Chitimachan Indian burial mound located in Coquille Bay. The preservation of the integrity of this burial mound is very important to the Cultural Section of the USACE when they review applications for permits within the Henderson Lake area.

Spillway – 100 ft. wide
Gate size – Gate system (open/close)
Condition – Fair to good (most recent repairs done July, 2013)

At the northern end of Henderson Lake, the Courtableau control structure is owned and operated by the USACE. It is located approximately one mile south of U. S. Highway 190 between Port Barre and Krotz Springs. The structure is made up of two features. A diversion control structure completed in 1942 consisting of two weirs with crests set at 18 feet National Geodetic Vertical Datum (NGVD) that puts water in the borrow canal located on the landside of the WABPL. This diversion is also used to maintain low flows in Bayou Teche and the Vermilion River for rice irrigation and water quality control. In addition, there is a drainage structure, the Bayou Courtableau Control Structure, in the WABPL that diverts landside flood waters into the northern end of Henderson Lake. This structure, consisting of five reinforced concrete box culverts measuring 10 ft. by 15 ft. by 234 ft. deep, was built by the USACE in 1956. This is one of only two structures that provide entry points for water into the Henderson Lake area other than precipitation. When the Atchafalaya River rises, its backwaters flow northward through the southern control structure, which is the other point of entry into the lake. Water entering through the southern structure also has to exit through that same structure. Water flowing into Henderson Lake from the Courtableau Structure is often of poor quality due to the high loading of organic materials from agricultural runoff in flood conditions.

Who controls

Though the structure was built on the private land of the St. Martin Land Co., the St. Martin Parish Government operates the control structure receiving management guidance from Louisiana Department of Wildlife & Fisheries (LDWF).

Figure 1. Location of water control structures within Henderson Lake, LA.

LAKE AUTHORITY

Association

There is no official lake association or lake commission. However, the following groups work together to manage the lake.

U.S. Army Corps of Engineers- Port Barre Office, LA (337) 585-0853
St. Martin Parish – Parish President, Guy Cormier, (337) 394-2200
St. Martin Land Company - (337) 228-7501
LDWF- Inland Fisheries, New Iberia office (337) 373-0032
City of Henderson, Mayor Sherbin Collette (337) 319-5267

Currently, there is no official protocol for opening the spillway. The St. Martin Parish Government has historically operated the control structure as needed or by request from interested parties. During a meeting in June 2014 to discuss a potential drawdown for Henderson Lake, St. Martin Parish President Guy Cormier agreed to use the LDWF Henderson Lake Management Plan as the operational plan to be used during future drawdowns.

Authorization

UNKNOWN

ACCESS

Maps with locations of boat ramps attached
(SEE MAP – APPENDIX I)

Boat docks

3 public boat ramps and 8 private boat ramps.
The public boat ramp located under Interstate 10 (I-10) at the Butte La Rose exit is a very popular launch for fisherman, kayakers, swamp tour operations, and other recreational users. Data collected from a USACE car-counting device showed 50,630 vehicles entering the launch area between October 2012-September 2013 (USACE, personal comm.).

Piers

Bank fishing is limited. There is an opportunity for bank fishing near the public boat ramp under Interstate 10 at the Butte La Rose exit.

State/Federal facilities

Indian Bayou Wildlife Management Area, owned by the U.S. Army Corps of Engineers, is located in south-central Louisiana. The Indian Bayou area is approximately 28,500 acres located in St. Landry and St. Martin parishes. The area is located between Baton Rouge and Lafayette, north of I-10 and south of U.S. Hwy 190 west of the Atchafalaya River. User groups consist of hunters, fishermen, hikers, canoeists and kayakers, birders, and site seers.
Link to Indian Bayou WMA:
http://www.mvn.usace.army.mil/Missions/Recreation/AtchafalayaBasin.aspx

Indian Bayou Office in Port Barre, LA
Park Manager, Barton Rodgers – (337) 585-0853
Indian Bayou Ranger station – (337) 228-1313

Reefs
No artificial reefs have been placed by LDWF, though some have been purchased and placed privately by fishermen to attract species such as crappie and sunfish.

SHORELINE DEVELOPMENT

State/National Parks
The recently established (2006) Atchafalaya National Heritage Area stretches across 14 Parishes in south-central Louisiana, emphasizing the cultural and ecological diversity of the area. Link to site: http://www.atchafalaya.org/index.php

Shoreline development by landowners
Limited development, consisting of commercial boat launches, restaurants and bait stands on private property.

PHYSICAL DESCRIPTION

Henderson is a backwater swamp consisting mainly of cypress, willow, and cottonwood trees. Areas such as the bays range from 20 – 30 feet deep. In the flats, water depths average 3 feet when the lake is at pool stage. Numerous trees, stumps, logs and submerged vegetation make up the majority of the aquatic habitat.

Shoreline length
90 miles

Timber type
Bald cypress (*Taxodium distichum)*, black willow (*Salix nigra*), water oak (*Quercus nigra*), bitter pecan (*Carya aquatica*), and buttonbush (*Cephalanthus occidentalis)* are the predominant bottomland hardwood trees occurring in and around Henderson Lake.

Average depth
7.0 ft.

Maximum depth
30 ft.

Natural seasonal water fluctuation
Water levels can change dramatically from rainfall or rises in the Atchafalaya River. During high water, Henderson receives backwater from the Atchafalaya River. During low water,

Bayou Courtableau is the main source of water. Typically, water fluctuates 4 – 5 feet annually, which may increase the acreage of Henderson Lake from 5,000 to 7,500 acres.

EVENTS / PROBLEMS

Aquatic Vegetation

There is an ongoing concern with the infestation of the aquatic plants, hydrilla (*Hydrilla verticillata*) and water hyacinth (*Eichhornia crassipes).* Annual requests are received from fishermen, hunters, camp owners, and boat launch operators to clear floating plants (mainly water hyacinth) for boating access. Many requests come from owners of private pay-to-launch boat ramps and tourism businesses. Unfortunately, immediate relief is expected when vegetation is treated. However, the chemical used to control water hyacinth is a systemic herbicide and can take more than a few days to several weeks to completely kill the plants depending on the air temperature. Private boat landings as well as the public launch at the I-10 Butte La Rose Welcome Center are often cleared of water hyacinth only to have rafts of new plants block the ramps after changes in wind direction or water levels. During the summer and fall of 2013 and 2014, there was approximately 50% coverage of hydrilla in Henderson Lake (Figure 1). Presently, the coverage is unknown, but it appears to be significantly less than in previous years. By late summer in previous years, the north and south flats would 'top out' with hydrilla at the water surface, expanding growth to the entire water column. In 2015 none of the excess growth has been seen, though it undoubtedly remains in the lake. Giant salvinia (*Salvinia molesta*) appears to be rapidly increasing within the lake and may become one of the more problematic species of aquatic plants in Henderson Lake in the near future.

Figure 1. Henderson Lake hydrilla coverage as of June, 2013

The capability exists to lower the water level in the lake to manage hydrilla infestations. Recent dredging efforts (2012-2013) allow continued access to private boat launches and tourism businesses during low water conditions. In the past, inconsistent access was a concern among business owners and one of the reasons drawdowns did not occur.

The various landowners within Henderson Lake do not always agree on management objectives. The landowners include the U.S. Army Corp of Engineers (**See Appendix II**), St. Martin Land Co., some State owned land and water bottoms (**See Appendix III**) and other minor in-holdings. It is assumed that the majority of the property not marked as state water bottoms or Corps property is private property.

State owned

Opelousas Bay	288 acres
Lake Bigeaux	34 acres
Lake Pelba	216 acres
School Board	640 acres
Total	1,178 acres

USACE aquatic plant spraying operations on Henderson Lake were discontinued on October 2, 2011. As a result, the responsibility has been accepted by LDWF.

MANAGEMENT ISSUES

AQUATIC VEGETATION

Herbicide applications are used as needed to control water hyacinth infestations. LDWF began controlling this invasive species in the 1960's. An average of 3,400 acres of floating vegetation, predominantly water hyacinth, is treated annually in Henderson Lake by LDWF. Only herbicides approved for aquatic use by the EPA are used. Water hyacinth is treated with applications of 2,4-D at a rate of 0.5 gal/acre.

Henderson Lake is relatively clear and subject to excessive growth of submerged aquatic vegetation. Native species include coontail (*Ceratophyllum demersum)*, fanwort (*Cabomba caroliniana)*, and American lotus (*Nelumbo lutea*). Non-native species include hydrilla (*H. verticillata)*, common salvinia (*Salvinia minima)*, giant salvinia (*Salvinia molesta*), and water hyacinth (*Eichhornia crassipes).*

The amount of vegetation sprayed and herbicide used annually from 2008 to 2011 is found in Table 1-A. The amount of vegetation sprayed and herbicide used annually from 2012 to 2013 are found in Table 1-B. An additional 1,000 acres sprayed in 2011 by the USACE is not included in the table. Additionally, LDWF secured a private contractor to spray additional areas using aerial and boat application during the winter of 2011/2012. The

spraying of the north flats helped to control a major nursery area of water hyacinth that continually supplied vegetation to the rest of the lake. The action helped to alleviate a large portion of the hyacinth problem.

Private boat launches were cleared of water hyacinth in November and early December 2011 as a result of using private contract sprayers. With the rise of the Atchafalaya River, additional hyacinth was introduced and complaints resumed.

Additional areas sprayed in 2012 not mentioned in the table include 65 acres of alligator weed and water hyacinth treated with 50 gallons of imazapyr. An aerial application was conducted in early winter of 2012, treating 360 acres of water hyacinth with 180 gallons of 2,4-D. Another treatment to 820 acres of water hyacinth was applied by boat in late spring/early summer. A total of 410 gallons of 2,4-D were applied during that effort.

Giant salvinia was first detected in Henderson Lake in the fall of 2012. Though control efforts were made, plants were observed again in 2013. Biological controls were introduced in September 2013 with the release of plant material containing giant salvinia weevils (*Cyrtobagous salviniae*). An estimated 19,360 adult weevils were released at that time. Another release conducted in July 2015, included an estimated 14,580 adult weevils.

In 2013, LDWF contracted private applicators to spray additional areas. They treated 4,080 acres of water hyacinth using 2,040 gallons of 2,4-D. All herbicide applications included a non-ionic surfactant at a rate of 0.125 gallons per acre.

During 2014, 2,215 acres of water hyacinth and 63 acres of alligator weed were treated with 2,4-D. Additionally, 34 acres of common salvinia and 56 acres of giant salvinia were treated with either a glyphosate/diquat mixture, or diquat depending on the time of year. During November 1st-March 31st, only diquat is used to spray salvinia species, while a glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also, 8 acres of pennywort were treated with 2,4-D. No contract spraying was necessary in 2014.

At the end of 2014, LDWF's Inland Fisheries Division began an attempt to downsize the aquatic plant program by ending temporary sprayer positions and focus more on private applicator contracts to treat problematic areas. This cost-savings effort removed 2 sprayers from the District 9 office that assisted in spraying efforts on Henderson Lake. Because of this, there will no longer be a dedicated LDWF spray crew on the lake. Vegetation management will instead be achieved through privately contracted herbicide treatments.

As of August 2015, 205 acres of water hyacinth had been treated with 2,4-D. No contract spraying has been necessary thus far.

DRAWDOWNS

Drawdowns expose the lake bottom and in doing so will retard aquatic weed infestations. They also improve fish spawning habitat and facilitate access for recreational and

commercial activities. All management decisions related to Henderson Lake are accompanied by concerns that include access to private landings, an Indian burial ground, and boater access.

Type map

Vegetative type map sampling was conducted in the fall of 2003, 2004, 2005, and 2006. The most recent type map is included in **Appendix IV**.

Biomass

Vegetation biomass sampling has not been conducted in Henderson Lake.

Treatment history by year

Biological

Biological treatment was first conducted in 2013 with the release of plant material containing giant salvinia weevils. An estimated 19,360 adult weevils were released at that time. Another stocking effort in late July 2015 was conducted with an estimated 14,580 adult weevils being released.

An additional biological control was attempted to control hydrilla in spring 2014, with the release of 25,000 triploid (sterile) grass carp (*Ctenopharyngodon idella).* Larger grass carp (12+ inches) were purchased for stocking to try and reduce the amount of predation upon the newly released fish, as well as put a larger fish that can readily consume more hydrilla than smaller ones. Results of this effort are still unknown. Triploid grass carp often take several years before the effects of their predation on submerged vegetation is noticeable.

Chemical

Herbicide applications are routinely used to control water hyacinth. LDWF began controlling the invasive species in the 1960's. An average of 3,400 acres of surface vegetation, predominantly water hyacinth, is treated annually. Details are listed in Tables 1-A & B. Water hyacinth is treated with applications of 2,4-D at a rate of 0.5 gal/acre.

In 2002, approximately 4,000 acres of hydrilla were treated by the Louisiana Department of Natural Resources (LDNR) in an effort to contain the spread. In 2006, 525 acres of hydrilla were treated by LDWF with Cutrine Plus® at a rate of 2 gallons per acre with Sonar PR® at 4 pounds per acre. Also, 500 acres were treated by LDNR. In 2009, a treatment including 3,240 lbs. of SONAR PR, 2,880 lbs. of SONAR Q was applied to 1,018 acres in the south flats of Henderson Lake. Two weeks later, the Atchafalaya River rose above flood stage, inundating Henderson Lake. The flood diluted the Sonar treatment, rendering it ineffective.
The Corps of Engineers treated approximately 1,000 acres of water hyacinth on Corps property in July, 2011.

Table 1-A. Acres of aquatic vegetation treated by LDWF spray crews in Henderson Lake - listed by vegetation type and applied herbicide, for the years 2008 to 2011.

			Year				Total
			2008	2009	2010	2011	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
Body of Water	Vegetation	Herbicide	.	.	.	.	.
10302 - Henderson Lake	Algae, Filamentous						
		Knockout	.	.	.	1	1
		Reward	.	.	.	1	1
	Alligatorweed	2,4-D	.	.	5	.	5
		Aqua Master	.	.	10	.	10
		Platoon	.	28	2	.	30
	Duckweed	Knockout	.	.	23	1	23
		Reward	.	.	.	1	1
	Frog's Bit	Knockout	.	1	1	.	2
	Hydrilla	Sonar AS	.	2,000	.	.	2,000
		Sonar PR	.	571	.	.	571
		Sonar Q	.	447	.	.	447
	Pennywort	2,4-D	6	.	.	.	6
		Diquat E Pro 2L	.	3	.	.	3
		Knockout	.	1	4	.	5
	Primrose	Platoon	.	14	2	.	16
	Salvinia, Common	Aqua Master	.	23	42	26	91
		Aquastar	15	.	.	.	15
		Diquat E Pro 2L	.	40	.	.	40
		Knockout	.	90	148	.	239
	Water Hyacinth	2,4-D	144	60	310	3,320	3,834
		Aqua Master	.	7	65	.	72
		Aquastar	15	.	.	.	15
		Diquat E Pro 2L	.	14	.	.	14
		Knockout	.	45	34	.	79
		Platoon	.	93	731	1,080	1,904
Total			179	3,437	1,377	4,430	9,423

Table 1-B. Acres of aquatic vegetation treated by LDWF spray crews in Henderson Lake - listed by vegetation type and applied herbicide, for the year 2012-2015, and future use.

			Year				Total
			2012	2013	2014	2015	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
Body of Water	Vegetation	Herbicide	.	.	.	.	.
10302 - Henderson Lake	Algae, Filamentous	Knockout	.	.	.	.	.
		Reward	.	.	.	.	.
	Alligator weed	2,4-D	50	114	.	.	164
		Aqua Master	.	36	.	.	36
		Tribune	.	5	.	.	5
		Round-Up Custom	.	.	21	6	27
		Weedestroy AM-40	.	.	42	.	42
	Duckweed	Knockout	.	.	.	.	.
		Aqua Master	.	13	.	.	13
	Pennywort	Tribune	.	.	8	.	8
	Hydrilla	Sonar AS	.	.	.	.	.
		Sonar PR	.	.	.	.	.
		Sonar Q	.	.	.	.	.
	Salvinia, Giant	Round-Up Custom	.	.	.	6	6
		Aqua Master	8	34	.	.	42
		Tribune	.	22	56	.	78
	Sedge sp.	2,4-D		7	.	.	7
		Aqua Master	8	35	.	.	43
		Tribune	.	14	.	.	14
	Salvinia, Common	2,4-D	.	50	.	.	50
		Aqua Master	245	212	.	.	457
		Platoon	.	10	.	.	10
		Round-Up Custom	.	75	.	6	81
		Tribune	.	20	34	.	54
	Water Hyacinth	2,4-D	2,715	1,730	.	99	4,544
		Aqua Master	.	162	.	.	162
		Platoon	.	3,990	160	.	4,150
		Round-Up Custom	.	75	21	6	102

			Year				Total
			2012	2013	2014	2015	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
		Tribune	.	23	156	46	225
		Weedestroy AM-40	.	300	1878	60	2238
	Water Paspalum	Aqua Master	.	47	.	.	47
Total			3,026	6,974	2,376	229	12,605

HISTORY OF REGULATIONS

Recreational

Statewide regulations are in effect for all fish species.
The recreational fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

The 14 inch minimum length limit (MLL) for black bass was implemented as an emergency measure following the fish kill caused by Hurricane Andrew in 1992. The regulation was implemented to protect bass that had survived the storm and allow them to spawn at least once before becoming available to harvest. In 1993, the regulation was renewed with a sunset date of 1995. In 1995, the regulation was renewed again for a 2 year period. During this time biologists were asked to determine if the regulation increased the number of large bass in angler creels. In 1997, the regulation was renewed without a sunset clause with popular support. Most anglers viewed the minimum length limit as a method to control harvest of black bass in the system. In 2012, the Inland Fisheries Section released a report entitled "Evaluation of the 14 Inch Minimum Length Limit for Largemouth Bass in the Atchafalaya Basin and Adjacent Waters, Louisiana." The report described population characteristics of the largemouth bass population and the history of the recreational fishery. This study found that slow growth, short life span, and the frequent catastrophic events are inherent factors that preclude benefits from any recreational harvest regulation, including the 14 inch minimum length limit. As such, the 14 inch MLL was determined to be an ineffective regulation. Link to the full report: LDWF Atchafalaya Basin Bass Report

The Louisiana Wildlife and Fisheries Commission promulgated a rule to repeal the 14 inch MLL on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, regulations included a 7 fish daily creel limit with no MLL. The revised regulation was in effect for two years. Statewide regulations of a 10 fish daily creel limit went into effect on June 20, 2015.

Black Bass – no minimum length limit, 10 daily bag limit (7 fish bag limit *was* in effect for 2 years, starting June, 2013). The 2-year period ended in June 2015, with the creel limit

reverting to statewide regulations.

Commercial

Statewide commercial regulations and seasons can be found at the following link: http://www.wlf.louisiana.gov/fishing/commercial-fishing

DRAWDOWN HISTORY

Drawdown date

There have been several drawdowns conducted to attempt to control submerged vegetation. Hydrilla was discovered in 1994. In two years, the invasive plant covered 50% of Henderson Lake. A fall/winter drawdown in 1996/97 was unsuccessful due to heavy rains. Between 1997 and 2000, drawdowns were recommended by LDWF but were not conducted due to lack of local public support (Table 2). In 2000/2001 a successful fall/winter drawdown was conducted, but in 2001/2002 the fall/winter drawdown was hampered by rainfall and a rise of the Atchafalaya River. In 2006, a 2-foot drawdown in the late summer enabled LDWF and DNR to apply herbicide (SONAR) to control hydrilla infestations. Approximately 1,200 acres were treated south of I-10. Minimal control was achieved. In 2007, another 2 foot drawdown was conducted and LDWF applied Sonar. Approximately 400 acres of hydrilla were treated on the South Flats. In 2008, an attempt to draw the lake down failed due to high water levels. In 2009, another 2 foot drawdown allowed for an aerial application of Sonar that treated 1,018 acres of hydrilla coverage. Two weeks later the Atchafalaya River rose above flood stage, inundating Henderson Lake. The flood diluted the Sonar treatment, rendering it ineffective. Dense hydrilla growth in Henderson Lake remains.

Funds made available by the LDNR Atchafalaya Basin Program enabled the dredging of heavily used boat lanes near private landings. The dredging was completed in the winter/spring of 2012/2013. The work provides private boat launches and swamp tour companies continued access during a drawdown. Because this controversial issue was finally addressed, a drawdown was planned to begin in late summer 2013 through winter of 2014. However, the permit was not issued due to the length of the permitting process, aided by a government shutdown (USACE, personal communication). The USACE issued a drawdown permit, good for 5 years, in August 2014. A drawdown was then initiated in mid-August of 2014, and water levels were maintained at 6.0 ft. MSL until November 1st. During this time, the north and south flats on either side of the I-10 bridge were exposed, drying up all previously submerged hydrilla. Also, the low water levels stranded a large amount of water hyacinth across the lake, causing it to root down heavily where it was stranded. Due to a lack of rainfall, water levels remained below pool stage until heavy rains came around mid-December. These heavy storms quickly raised water levels with cold, highly turbid water to an elevation well over pool stage (up to and over 12 ft. MSL) blocking out sunlight to the hydrilla tubers or roots, and drowning the rooted-down water hyacinth. The water levels remained high for months, only slightly dropping back to 10 ft. MSL in March, and then a steadily rising Atchafalaya River heavily inundated the lake for the rest of the summer, with levels still not at pool stage by August, 2015. The triple combination of a successful drying out period between August and mid-November, the stocking of 25,000 triploid grass carp in the spring of 2014, and the prolonged high-water that never allowed sunlight to reach the

hydrilla or water hyacinth is believed to have reduced submergent vegetation to levels not seen on Henderson Lake in years. The perpetual water hyacinth problem has been reduced to almost non-existence, and during a survey to evaluate the hydrilla coverage in July, none could be found. The hydrilla tubers are undoubtedly still there, and consecutive drawdowns will be needed to exhaust their root storages. An annual fall/winter drawdown is recommended for 5 consecutive years for hydrilla control.

Table 2. Years in which drawdowns have been conducted on Henderson Lake, LA.

DRAWDOWN HISTORY				
Date Opened	Date Closed	Purpose	Results	Issues
Fall 1996	Winter 1997	Hydrilla control	Unsuccessful, 40% exposed	5 ft. drawdown, heavy fall rains
1997-2000	*	Hydrilla control	Recommended	No action taken
Fall 2000	Winter 2001	Hydrilla control	Successful, 60% exposed	6 ft. drawdown, fish kill
Fall 2001	Winter 2002	Hydrilla control	Unsuccessful	Heavy rains
Late summer 06	Fall 2006	Hydrilla control	Little success w/ 2 ft. drawdown	1,200 acres treated
Late summer 07	Fall 2007	Hydrilla control	Little success w/ 2 ft. drawdown	400 acres treated
Late summer 08	Fall 2008	Hydrilla control	Unsuccessful	High water
Fall 2009	N/A	Hydrilla control	No success w/ 2 ft. drawdown	1,018 treated acres flooded by high river waters
Fall 2013 (planned)	N/A	Hydrilla control	N/A	Permit not issued (USACE)
Late Summer 2014	November 1	Hydrilla control	Successful, flats and north woods exposed	Environmental factors all played in favor of the drawdown.
Fall 2015 (planned)	N/A	Hydrilla control	Not yet available	Not yet available

* Between 1997 and 2000, drawdowns were recommended by LDWF but were not supported by the local public, and were not conducted.

Fish kills

Fish mortality was associated with the 2001 drawdown due to low dissolved oxygen levels. Approximately 22,000 fish perished. Largemouth bass, crappie and sunfish made up approximately 27 % of the loss.

FISH KILLS / DISEASE HISTORY

In 2000 Largemouth bass virus sample – 20 bass sampled (10 tested positive)
In 2002 Largemouth bass virus sample – 23 bass sampled (0 tested positive)

A minor fish kill occurred in 1992 due to Hurricane Andrew, but was limited to the very northeast end of the lake.
Another fish kill occurred in 2005 due to Hurricane Rita. Game species such as largemouth bass, crappie, sunfish and commercial species such as catfish made up 25 % of the kill, which totaled approximately 150,000 fish.

Fish kills occurred related to the 2011 flood, though no quantitative estimates of fish killed are available.

Small, isolated fish kills were reportedly seen during the late summer of 2015 as the Atchafalaya River quickly dropped and stagnant, anoxic waters drained from the flooded forests and swamps. These reports were mentioned after the fact, and were not able to be documented.

Poor water quality is often associated with high water levels in Henderson Lake. Fish kills often occur when the Atchafalaya River level rises higher than the southern Henderson Lake control structure. As the flood waters rise in the lake, dry areas become inundated, including the organic terrestrial material. Decomposition of these organic materials increases the biological oxygen demand to the extent that insufficient dissolved oxygen is available for fish. The solubility of water to oxygen also decreases in direct proportion to temperature. When the river level drops, poor quality water is concentrated in some areas as water drains. The resulting conditions can be lethal for shellfish and finfish. The potential for fish kills is especially high if flood water levels continue into summer months and are subsequently drained with a rapidly descending river hydrograph.

CONTAMINANTS / POLLUTION

Water quality

Mercury advisories – Issued by Department of Health & Hospitals in 1996, 1999 and updated in 2003. Fish Consumption Advisory - Henderson Lake

Water level

The U.S. Geological Survey has real-time data available at the following websites
http://waterdata.usgs.gov/la/nwis/rt

1. Lake Pelba at I-10 near Henderson, LA (Gage height and Stream level, NAVD)
http://waterdata.usgs.gov/usa/nwis/uv?site_no=302020091435700
2. Pontoon Bridge Canal near Butte Larose, LA (Gage height and Stream level, NAVD)
http://waterdata.usgs.gov/la/nwis/uv?site_no=301655091440800

BIOLOGICAL

Fish samples

In the 1960's and 1970's, biomass sampling (rotenone with block-off net) was conducted in Henderson Lake. From the mid 1980's to present, electrofishing, creel surveys, nets,

rotenone, seines and water quality samples have been used to help monitor and manage fisheries in this water-body. Table 3 below describes sampling methods/gear types and scheduled sampling activities through 2017.

Table 3. Historical, present and proposed independent fisheries sampling conducted in Henderson Lake, LA, from 2005 to 2017.

2005	Electrofishing, creel survey, aquatic type map, aquatic weed treatment
2006	Electrofishing, gill nets, water quality, stocking, aquatic type map
2007	Electrofishing, water quality, crappie age & growth, stocking, aquatic weed treatment, lead nets, drawdown
2008	Creel survey, stocking, aquatic type map, aquatic weed treatment
2009	Electrofishing, rotenone, gill nets, seine, water quality, bass age/genetics, aquatic weed treatment
2010	Electrofishing, hoop nets, water quality, aquatic weed treatment
2011	Electrofishing, gill nets, water quality, aquatic weed treatment
2012	Electrofishing, gill nets, water quality, aquatic weed treatment
2013	Electrofishing, gill nets, water quality, aquatic weed treatment, and plankton net pulls to measure larval Asian carp abundance.
2014	Electrofishing, gill nets, water quality, aquatic weed treatment, and plankton net pulls to measure larval Asian carp abundance,
2015	Electrofishing, water quality, aquatic weed treatment, other projects as necessary
2016	Electrofishing, water quality, aquatic weed treatment, other projects as necessary
2017	Electrofishing, water quality, aquatic weed treatment, other projects as necessary

Lake records

9.8 lbs. for largemouth bass

Stocking History

Two species of sport fishes have been stocked into Henderson Lake in recent years, the Florida largemouth bass (FLMB) and hybrid striped bass. The stocking history (species and number) is shown in Table 4 below.

In a further attempt at controlling hydrilla, 25,000 triploid (sterile) grass carp, 12+ inches in length were stocked during the spring of 2014. Fish were certified as being triploid through a USFWS grass carp ploidy verification program.

Table 4. The stocking history of Henderson Lake, LA, from 2000 to 2006.

Year	FLMB	Hybrid Striped bass
2000	55,182	74,583
2001	49,980	-
2002	63,008	62,882
2003	67,127	29,784
2004	66,165	-
2005	65,624	-
2006	74,720	-
Totals	**441,806**	**167,249**
* All fish were fingerlings		

Species profile

Table 5. Fish species that have been collected in LDWF samples in Henderson Lake, LA.

List of Fishes Collected in Henderson Lake, Louisiana

Northern largemouth bass, *Micropterus salmoides*
Florida largemouth bass, *Micropterus floridanus*
Black Crappie, *Pomoxis nigromaculatus*
White Crappie, *Pomoxis annularis*
Bluegill, *Lepomis macrochirus*
Redear sunfish, *Lepomis microlophus*
Green sunfish, *Lepomis cyanellus*
Warmouth, *Lepomis gulosus*
Orangespotted sunfish, *Lepomis humilis*
Longear sunfish, *Lepomis megalotis*
Redspotted sunfish, *Lepomis miniatus*
Bantam sunfish, *Lepomis symmetricus*
Banded pygmy sunfish, *Elassoma zonatum*
Gizzard shad, *Dorosoma cepedianum*
Threadfin shad, *Dorosoma petenense*
Black bullhead catfish, *Ameiurus melas*
Yellow bullhead catfish, *Ameiurus natalis*
Blue catfish, *Ictalurus furcatus*
Channel catfish, *Ictalurus punctatus*
Flathead catfish, *Pylodictis olivaris*
Spotted gar, *Lepisosteus oculatus*
Longnose gar, *Lepisosteus osseus*
Alligator gar, *Atractosteus spatula*
Bowfin, *Amia calva*

River carpsucker, *Carpiodes carpio*
Bigmouth buffalo, *Ictiobus cyprinellus*
Smallmouth buffalo, *Ictiobus bubalus*
Brook silverside, *Labidesthes sicculus*
Golden topminnow, *Fundulus chrysotus*
*Unknown darter, *Etheostoma* spp.
Common carp, *Cyprinus carpio*
Paddlefish, *Polyodon spathula*
Bighead carp, *Hypophthalmichthys nobilis*
Silver carp, *Hypophthalmichthys molitrix*
Grass carp, *Ctenopharyngodon idella*

Asian carp were first found in the lake in January, 2001.
*Electrofishing in the fall of 2014 found a largemouth bass with two *Etheostoma* sp. in its mouth and throat. Due to decomposition, not able to identify to species.

Genetics

Henderson Lake has a dominant native northern largemouth bass population (91%) while 9% of those fish tested have contained the Florida genome (Table 5).

Table 5. The genetic analyses of largemouth bass stocks on Henderson Lake, LA. during 1999 and 2004. Tissues were collected from LDWF standardized electrofishing samples.

YEAR	NORTHERN	FLORIDA	HYBRID	FLORIDA INFLUENCE
1999	100 %	0 %	0 %	0 %
2004	91 %	1 %	8 %	9 %

Threatened/endangered/exotic species

No threatened or endangered species have been documented within Henderson Lake. Exotic species include Asian carp (silver, bighead, common, and grass carp)

CREEL

Historic information

Angler creel surveys were conducted in 2000, 2001 and 2005. The survey method used was a dockside (access point) survey of completed fishing trips. Percent of total harvest by species is presented in Table 6.

Another creel survey was recently conducted, specifically for black bass. This survey began July 1, 2013 and continued through Dec. 31, 2014. This creel survey was designed to focus

on black bass since these were the only species affected by the 2013 regulation change.

Table 6. The results of creel surveys conducted on Henderson Lake, LA, by year. Results are presented as the percent of total harvest of fish by species.

SPECIES	2000	2001	2005	AVERAGE
Bluegill	34.9%	55.0%	53.2%	45.5%
Black Crappie	25.9%	14.9%	25.2%	23.6%
White Crappie	23.0%	6.6%	5.7%	13.5%
Largemouth Bass	7.0%	3.7%	4.1%	5.3%
Warmouth	1.7%	2.2%	4.9%	3.0%
Redear Sunfish	1.7%	2.7%	2.9%	2.3%
Freshwater Drum	1.0%	8.1%	0.2%	2.0%
White Bass	0.5%	1.9%	0.7%	0.8%
Blue Catfish	0.1%	1.4%	1.1%	0.7%
Channel Catfish	0.4%	1.8%	0.2%	0.6%
Yellow Bullhead	0.2%	0.0%	1.3%	0.6%
Buffalo	1.3%	0.0%	0.0%	0.6%
Yellow Bass	0.4%	1.6%	0.0%	0.5%
Bowfin	0.6%	0.0%	0.4%	0.4%
Spotted Gar	0.8%	0.0%	0.0%	0.3%
Spotted Sunfish	0.1%	0.2%	0.2%	0.1%
Carp	0.2%	0.0%	0.0%	0.1%
Black Bullhead	0.1%	0.0%	0.0%	0.0%
Smallmouth Buffalo	0.0%	0.0%	0.0%	0.0%
Flathead Catfish	0.0%	0.0%	0.0%	0.0%

HYDROLOGICAL CHANGES

GRIMMET CANAL STRUCTURE- Owned and operated by the U. S. Army Corps of Engineers, this structure is located north of Interstate 10 (I-10) between Port Barre and Krotz Springs, Louisiana near Hwy 190. This structure is in place to allow for the removal of potential floodwaters from communities located along US 190, including Port Barre. When floodwaters reach 17.76 MSL this structure is opened and water flows through Henderson.

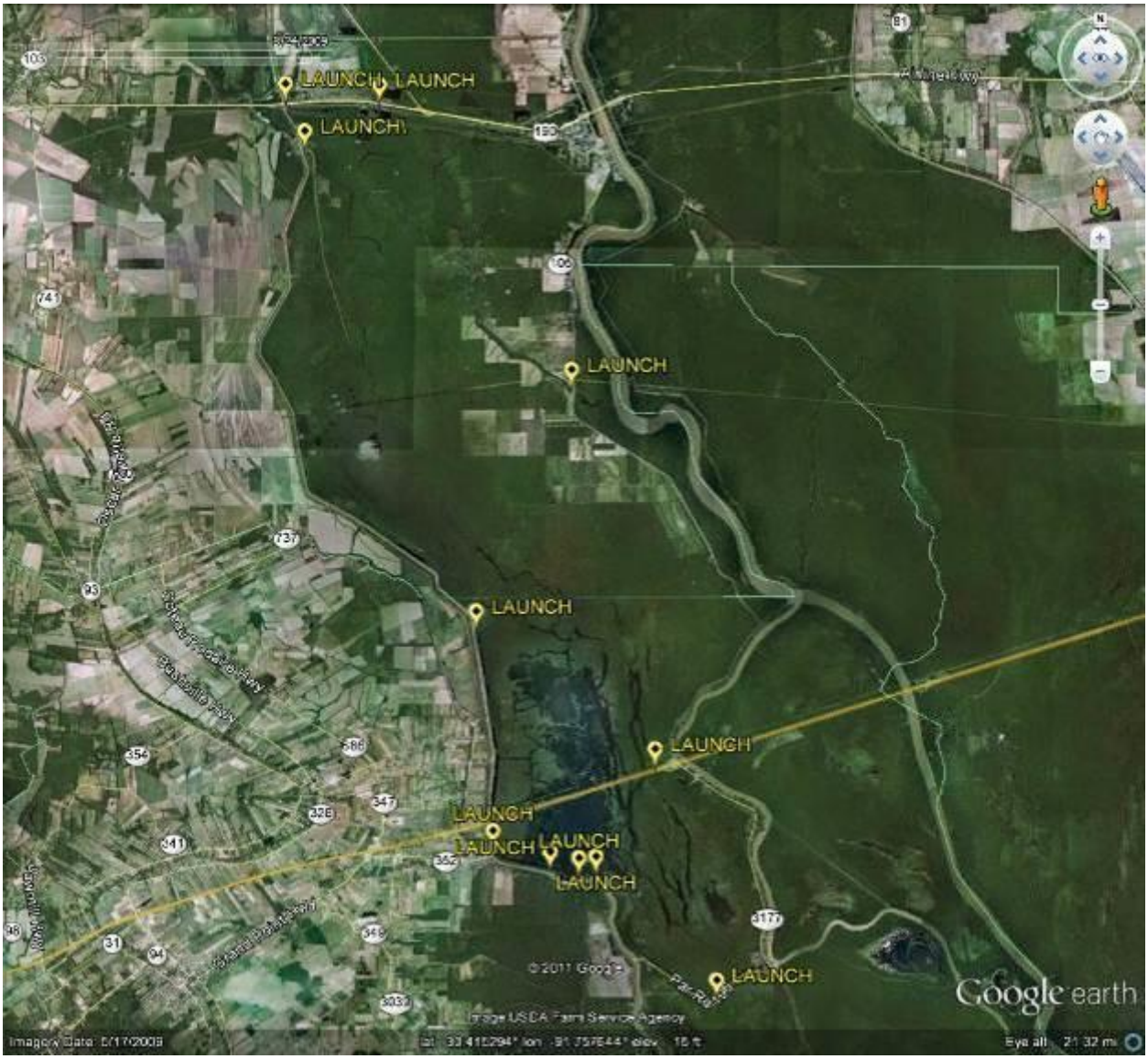
GATE ON HENDERSON – This control structure is located near Butte La Rose, south of I-10. St. Martin Parish operates this structure. This is a fixed structure set at 9.0 feet mean sea level (MSL).

DREDGING FOR I-10 – Water flow through Lake Henderson is typically from north to south, except when flood waters from the Atchafalaya River enter the system over the south control structure. Some of the canals were dredged to support specific uses, such as transport of materials to construct I-10 and for oil and gas exploration and production. At present these canals and bayous are utilized by the numerous marinas and tour operators located on

the lake for fishing access and tourism. Some of these canals were re-dredged in the winter/spring of 2012/2013 in order to allow continual access during a drawdown.

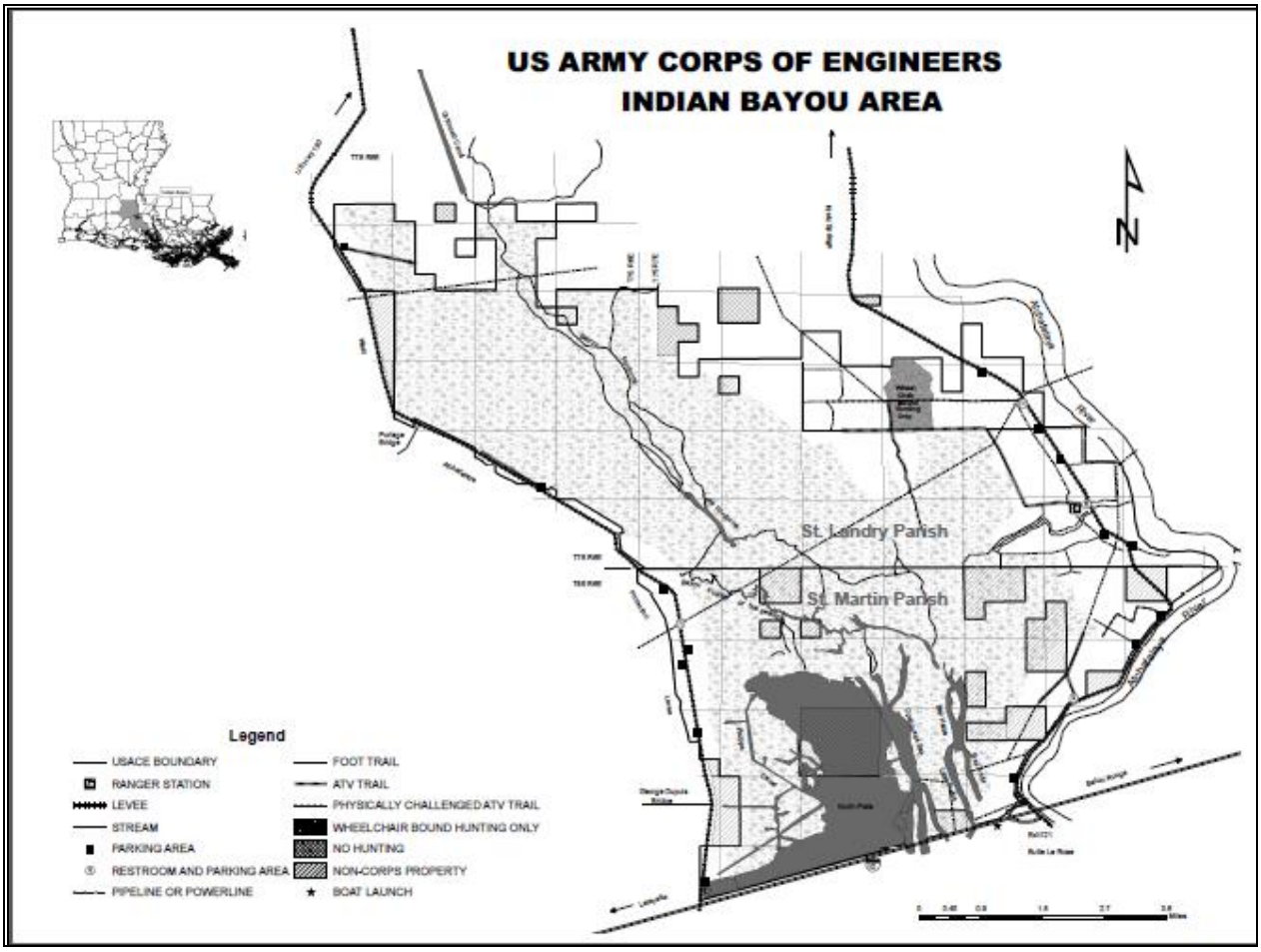
Appendix I
(Click here to return)

Access Map



Appendix II
(Click here to return**)**

Map of USACE property in Henderson.



Appendix III

(Click here to return)

Map of State Water-bottoms in Henderson Lake.

State water-bottoms in blue and state lands in orange and pink outlined in black.

Appendix IV
(click to return)

Henderson Lake
September 2006
Jody T. David

Henderson Lake, St. Martin parish, recently (8/28/06) was treated using SONAR to control the heavy infestation of Hydrilla south of interstate 10. Water levels in the lake were lowered two feet below pool stage to allow for adequate control; pool stage is 9.0 ft. (MSL).

Moderate amounts of common salvinia (*Salvinia minima*), coontail (*Ceratophyllum demersum*) and duckweed (*Lemna minor*) were found throughout the lake. Other plants that were observed in light to moderate amounts were primroses (*Ludwigia spp*.), sedge (*Carex spp*.), smartweed (*Polygonum hydropiperoides*), flatsedge (*Cyperus spp*.), and filamentous algae (*Pithophora spp*.) North of interstate 10 a heavy infestation of hydrilla and water hyacinth is present. This includes the north flats, Phillip canal, Coquille Bay and Fordoche Lake and bayou. These areas are Corps owned and were not treated.